

## Common Core Standards - Resource Page

The resources below have been created to assist teachers' understanding and to aid instruction of this standard.

Domain	Standard: 7.G.4-2 - Give an informal derivation of the relationship between the circumference and area of a circle
<p><b><u>Geometry</u></b>  <b>Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.</b></p>	<p><u>Questions to Focus Learning</u></p> <p>How does the area of a circle relate to the area of a rectangle?</p> <p>Knowing the relationship between area formulas can help in understanding the relationship between the circumference and the area of a circle.</p> <p><u>Student Friendly Objectives</u></p> <p><i>Knowledge Targets</i></p> <p>I know a circle can be decomposed to create a rectangle.  I know the height is the radius and the base is half the circumference.  I know the area of a rectangle relates to the area of a circle.</p> <p><u>Vocabulary</u></p> <p>area  circumference  radius/radii</p>

### Teacher Tips

This is the students' initial work with circles. Knowing that a circle is created by connecting all the points equidistant from a point (center) is essential to understanding the relationships between radius, diameter, circumference, pi and area. Students can observe this by folding a paper plate several times, finding the center at the intersection, then measuring the lengths between the center and several points on the circle, the radius. Measuring the folds through the center, or diameters leads to the realization that a diameter is two times a radius. Given multiple-size circles, students should then explore the relationship between the radius and the length measure of the circle (circumference) finding an approximation of pi and ultimately deriving a formula for circumference. String or yarn laid over the circle and compared to a ruler is an adequate estimate of the circumference. This same process can be followed in finding the relationship between the diameter and the area of a circle by using grid paper to estimate the area.

Another visual for understanding the area of a circle can be modeled by cutting up a paper plate into 16 pieces along diameters and reshaping the pieces into a parallelogram. In figuring area of a circle, the squaring of the radius can also be explained by showing a circle inside a square. Again, the formula is derived and then learned. After explorations, students should then solve problems, set in relevant contexts, using the formulas for area and circumference.

<http://illuminations.nctm.org/LessonDetail.aspx?id=U159>

Using estimation and measurement skills, students will determine the ratio of circumference to diameter and explore the meaning of  $\pi$ . Students will discover the circumference and area formulas based on their investigations.

### Vertical Progression

8.G.9 - Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

The above information and more can be accessed for free on the [Wiki-Teacher](#) website.

Direct link for this standard: [7.G.4-2](#)